

What is claimed is:

1. A ceiling air passage system for a vehicle air conditioner having an air conditioning unit for adjusting conditioned air to be blown into a passenger compartment of a vehicle, the ceiling air passage system comprising

a passage member for defining an air passage into which conditioned air from the air conditioning unit is introduced, the air passage being provided along a surface of a vehicle ceiling portion; and

a three-dimension structure member having a three-dimensional passage shape, the three-dimension structure member being disposed in the air passage,

wherein the passage member for defining a lower part of the air passage is provided with innumerable air outlets from which the conditioned air in the air passage is blown downward in the passenger compartment.

2. The ceiling air passage system according to claim 1, wherein the air passage is provided to enclose an entire periphery of a rectangular sunroof opening of the vehicle.

3. The ceiling air passage system according to claim 1, wherein the air passage is provided to enclose three edges of a rectangular sunroof opening of the vehicle.

4. The ceiling air passage system according to claim 1, wherein the three-dimension structure member is constructed with

a net structure of a fiber member.

5. The ceiling air passage system according to claim 1, wherein the air conditioning unit is disposed at least at one of vehicle front and rear sides in the passenger compartment, the ceiling air passage system further comprising

an air duct through which the air passage is connected to an air outlet portion of the air conditioning unit, the air duct being arranged in a vehicle pillar.

6. The ceiling air passage system according to claim 1, further comprising

a partition member for partitioning the air passage into a right passage area and a left passage area in a vehicle right-left direction,

wherein the right passage area and the left passage area are connected to the air conditioning unit such that the conditioned air from the air conditioning unit is independently blown into the right and left passage areas of the air passage.

7. The ceiling air passage system according to claim 6, wherein:

the air conditioning unit includes at least an electric blower for blowing air, a heat exchanger for performing a heat exchange of air blown by the electric blower, and a right-left independent temperature adjusting mechanism for independently adjusting temperature of air to be blown from the air conditioning unit into

the right passage area and temperature of air blown from the air conditioning unit into the left passage area; and

the air passage is provided such that the temperature of air blown from the air outlets in the right passage area and the temperature of air blown from the air outlets in the left passage area are independently adjusted.

8. The ceiling air passage system according to claim 6, further comprising

right and left air ducts connected to an air outlet portion of the air conditioning unit, through which the conditioned air from the air outlet portion of the air conditioning unit is introduced into the right and left passage areas, the right and left air ducts being arranged in right and left vehicle pillars adjacent to right and left side windows, respectively.

9. The ceiling air passage system according to claim 1, further comprising

a partition member for partitioning the air passage into a front passage area and a rear passage area in a vehicle front-rear direction,

wherein the front passage area and the rear passage area are connected to the air conditioning unit such that the conditioned air from the air conditioning unit is independently blown into the front and rear passage areas of the air passage.

10. The ceiling air passage system according to claim 9,

wherein the air conditioning unit includes front and rear air-conditioning portions disposed at vehicle front and rear sides in the passenger compartment, respectively, the ceiling air passage system further comprising:

a front right air duct and a front left air duct connected to an air outlet portion of the front air-conditioning portion, through which the conditioned air from the front air-conditioning portion is introduced into the front passage area, the front right air duct and the front left air duct being arranged at the vehicle right and left sides; and

a rear right air duct and a rear left air duct connected to an air outlet portion of the rear air-conditioning portion, through which the conditioned air from the rear air-conditioning portion is introduced into the rear passage area, the rear right air duct and the rear left air duct being arranged at the vehicle right and left sides on a rear side of the front right and left air ducts.

11. The ceiling air passage system according to claim 9, wherein the air conditioning unit includes front and rear air-conditioning portions disposed at vehicle front and rear sides in the passenger compartment, respectively, the ceiling air passage system further comprising:

a front air duct connected to an air outlet portion of the front air-conditioning portion, through which conditioned air from the front air-conditioning portion is introduced into the front passage area; and

a rear air duct connected to an air outlet portion of the

rear air-conditioning portion, through which conditioned air from the rear air-conditioning portion is introduced into the rear passage area, the rear air duct being arranged at a vehicle rear side of the front air duct.

12. The ceiling air passage system according to claim 1, further comprising

a partition member for partitioning the air passage into a front right passage area, a front left passage area, a rear right passage area and a rear left passage area, in a vehicle right-left direction and a vehicle front-rear direction,

wherein the air passage is connected to the air conditioning unit such that the conditioned air from the air conditioning unit is independently blown into the passage areas of the air passage, respectively.

13. The ceiling air passage system according to claim 1, wherein:

the passage member for defining the air passage includes a heat insulating member disposed at a back side of a vehicle roof, and a ceiling base member disposed at a lower side of the heat insulating member to have a predetermined distance between the heat insulating member and the ceiling base member;

the air passage is provided in a flat space between the heat insulating member and the ceiling base member;

the three-dimension structure member is arranged substantially in an entire area of the flat space, and is constructed

with a net structure of a fiber member made of a synthetic resin;
and

the innumerable air outlets are provided substantially in
an entire area of the ceiling base member.

14. The ceiling air passage system according to claim 13,
wherein the three-dimension structure member is fixed to the ceiling
base member by using one of an adhesive and a mechanical fixing
member.

15. A vehicle ceiling structure for an air conditioner
having an air conditioning unit for adjusting a state of conditioned
air to be blown into a passenger compartment of a vehicle, the
ceiling structure comprising

a ceiling portion;

a rectangular sunroof opening provided in the ceiling
portion;

a passage member for defining an air passage into which
conditioned air from the air conditioning unit is introduced,
the air passage being provided along a surface of the ceiling
portion; and

a three-dimension structure member having a three-dimensional
passage shape, the three-dimension structure member being disposed
in the air passage, wherein:

the passage member for defining a lower part of the air passage
is provided with innumerable air outlets from which the conditioned
air in the air passage is blown downward in the passenger compartment;

and

the innumerable air outlets are provided around the rectangular sunroof opening.

16. The vehicle ceiling structure according to claim 15, wherein the air passage is provided to enclose an entire periphery of the rectangular sunroof opening.

17. The vehicle ceiling structure according to claim 15, wherein the air passage is provided to enclose three edges of the rectangular sunroof opening.

18. The vehicle ceiling structure according to claim 15, the air passage is provided substantially in a rectangular shape at a vehicle rear side of the rectangular sunroof opening.